

## ABSTRACT

The present invention relates to a zero-valent transition metal complex which can be used as a starting material for producing a catalyst usable for producing a polyolefin by ring-opening metathesis polymerization of an olefin and an epothilone by ring-closing metathesis reaction, and a method for efficiently producing, at low cost, an organometallic compound useful as a catalyst, using the zero-valent transition metal complex as a starting material. Provided is a method for producing a zero-valent transition metal complex (C), which comprises reacting a divalent transition metal complex (A) with an olefin (B), the complex (A) being selected from the group consisting of a divalent ruthenium complex (A<sup>1</sup>) and a divalent osmium complex (A<sup>2</sup>), thereby obtaining a zero-valent transition metal complex (C), wherein the reaction is conducted under reducing conditions and after the reaction, the resultant crude product is extracted at high temperature using a saturated hydrocarbon as an extracting solvent. Also provided is a method for producing an organometallic compound, which comprises reacting the metal complex (C) with a specific compound (D) and a neutral ligand (E) in one step.